

**To:** Rob Runkel[runkel@usgs.gov]  
**Cc:** Guy, Kerry[Guy.Kerry@epa.gov]; Way, Steven[way.steven@epa.gov]  
**From:** Christner, Jan  
**Sent:** Tue 8/18/2015 9:42:04 PM  
**Subject:** RE: Forwarded mail.... Pre & Post Gold King comparison (fwd)

Thanks, Rob.

Good to hear from you, too. I've just been doing some comparisons of the current mine discharge concentrations (we have 2 recent samples) against historic concentrations from 2009-2014 in both Gold King discharge and Cement Creek. I've also compared the concentrations against stream standards and calculated the % removal needed to prevent additional loading from the Gold King beyond the average load from 2009-2014. I think your information will add a lot to the discussion.

I'll look at expanding on your analysis with the historic data then send you what I come up with. Let me know if/when the new data come in.

Jan

Jan Christner  
Weston Solutions, Inc.  
505-269-1925 (cell)

-----Original Message-----

From: Rob Runkel [mailto:runkel@usgs.gov]  
Sent: Tuesday, August 18, 2015 3:34 PM  
To: Christner, Jan  
Cc: guy.kerry@epa.gov; Steve Way  
Subject: Forwarded mail.... Pre & Post Gold King comparison (fwd)

Hi Jan -- good to hear from you & sorry for the delay. I've yet to discuss this w/ Steve, but did discuss this briefly w/ Kerry yesterday..... Below you'll see a comparison I did between Oct 2012 and Wens of last week - looking at metal concentrations and loads at three streamgages in the Siverton area, and trying to quantify the effect of the gold king discharge. This is something you could easily expand on, by pulling historical data from those three gages and comparing the results w/ my recent sampling. To do so you would just need to update row 11 of the spreadsheet - entering the flow (Column H) and concentrations (columns I-R) associated w/ the historical data. The spreadsheet will then give you the % change based on my recent sampling.

In doing this exercise, it would be good to find some historical data w/ a similar flow distribution. As of last Wens, the Cement Creek gage (CC48) was flowing at 24 cfs, the upper Animas (A68) at 100 cfs, and Animas below town (A72) at ~ 240 cfs.

Again, I'm not sure what Steve had in mind or if you have the time, so its just a suggestion at this point. Let me know what you think. I should have some more data today from upper Cement Creek, and there may be a need for similar comparisons.

regards, Rob

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Rob Runkel  
Research Hydrologist

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----- Forwarded message -----

Date: Sat, 15 Aug 2015 13:09:21 -0600 (MDT)  
From: Rob Runkel <runkel@usgs.gov>  
To: Steve Way <Way.Steven@epamail.epa.gov>

Steve,

Here's the data from the 3 gages, sampled 8/12. In the attached spreadsheet I've compared this post gold king data w/ the Oct 2012 data set. Perhaps this comparison should be done w/ an higher flow data set, but the spreadsheet can be easily changed to do that (just add the flow and concentrations for any date, and the percentages will update; I would have some time to do this next week, but perhaps Jan can do it?).

Here's my take:

CC48 Cu concentrations are clearly elevated, consistent w/ what we know about the Gold King discharge. There's a >200% increase in Cu and Cd loads, and a > 100% increase in Ni and Pb loads.

A72. Concentration of most everything, including Cu, are less than Oct 2012. The high Cu conc from Cement is getting diluted out by upper animas (100cfs) and Mineral (100cfs) (Cement is 24 cfs). Like CC48, there's a >200% increase in Cu and Cu loads. There's a >100% increase in Mn and Zn loads.

To show how complex this analysis could be, I've included A68, which has nothing to do w/ the Gold King. Al, Cd, and Cu loads increase by over 200%, Mn, SO4, and Zn loads increase by over 100%. Again, nothing to do w/ Gold King -- perhaps it reflects more subsurface flow, due to wet conditions, from the May flower area (completely unsubstantiated by anything concrete, just an idea).

Send me a text if you want to discuss - I'm outside of Lyons and phone is spotty - but I can go into town.

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